Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): A system for processing a workpiece, comprising:

(A) a plasma immersion ion implantation reactor, comprising:

(1) an enclosure comprising a side wall and a ceiling and defining a chamber;

(2) a workpiece support pedestal within the chamber having a workpiece support surface facing said ceiling and defining a process region extending generally across said wafer support pedestal;

(3) gas distribution for introducing a process gas containing a first species to be ion implanted into a layer of said workpiece;

(4) an RF plasma source power generator coupled across said ceiling or said sidewall and said wafer support pedestal for capacitively coupling RF source power into said process zone;

(5) an RF bias generator having an RF bias frequency and coupled to said workpiece support pedestal for applying an RF bias to said workpiece;

(B) a second wafer processing apparatus;

(C) wafer transfer apparatus for transferring said workpiece between said plasma immersion ion implantation reactor and said second wafer processing apparatus.

Claim 2 (original): The system of Claim 1 wherein said second wafer processing apparatus comprises a cleaning species source plasma reactor comprising:

(1) a source of cleaning species precursor gases;

(2) a passage coupling said cleaning species source plasma reactor to said plasma immersion ion implantation reactor.

Claim 3 (original): The system of Claim 2 wherein said cleaning species precursor gases comprise a fluorine-containing species.

Claim 4 (original): The system of Claim 2 wherein said cleaning species precursor gases comprise a hydrogen-containing species.

Claim 5 (original): The system of Claim 1 wherein said second wafer processing apparatus comprises:

an optical metrology chamber for obtaining a measurement of ion implantation in a workpiece;

a process controller coupled to receive measurements from said optical metrology chamber for controlling said plasma immersion ion implantation reactor.

Claim 6 (previously presented): The system of Claim 1 wherein said second wafer processing apparatus comprises:

an ion beam implantation apparatus for ion implanting a second species into said layer of said workpiece.

Claim 7 (previously presented): The system of Claim 6 wherein said layer is a semiconductor material, and said first and second species are dopant impurities of opposite conductivity types relative to said semiconductor material.

Claim 8 (previously presented): The system of Claim 1 wherein said second wafer processing apparatus comprises:

a second plasma immersion ion implantation reactor for ion implanting a second species into said layer of said workpiece.

Claim 9 (previously presented): The system of Claim 8 wherein said layer is a semiconductor material, and said first and second species are dopant impurities of opposite conductivity types relative to said semiconductor material.

Claim 10 (original): The system of Claim 1 wherein said second wafer processing apparatus comprises an anneal chamber.

Claim 11 (original): The system of Claim 1 wherein said second wafer processing apparatus comprises:

a photoresist strip chamber.

Claim 12 (original): The system of Claim 1 wherein said second wafer processing apparatus comprises a wet clean chamber.

Claim 13 (original): The reactor of Claim 1 wherein said RF bias frequency is sufficiently low to enable ions traversing

the plasma sheath to attain an energy corresponding to a peak-to-peak voltage of said bias power generator.

Claim 14 (original): The reactor of Claim 13 wherein said RF bias frequency is sufficiently high to limit RF voltage drops across dielectric layers on said workpiece support pedestal to less than a predeterminded fraction of plasma sheath voltage near said workpiece support.

Claim 15 (original): The reactor of Claim 14 wherein said predetermined fraction corresponds to about 10%.

Claim 16 (original): The system of Claim 1 wherein said RF source power generator is coupled to said ceiling or said sidewall and said wafer support pedestal is coupled to an RF return potential.

Claim 17 (original): The system of Claim 1 wherein said RF source power generator is coupled to said wafer support pedestal and said ceiling or said sidewall is coupled to an RF return potential.

Claim 18 (original): The apparatus of Claim 1 wherein said RF bias generator has a bias RF frequency that is sufficiently low for ions in a plasma sheath near said workpiece to follow electric field oscillations across said sheath at said bias frequency.

Claim 19 (original): The apparatus of Claim 18 wherein said bias RF frequency is sufficiently high so that RF voltage drops across dielectric layers on said workpiece do not

exceed a predetermined fraction of the RF bias voltage applied to said workpiece support.

Claim 20 (original): The apparatus of Claim 19 wherein said predetermined fraction corresponds to about 10%.

Claim 21 (original): The apparatus of Claim 1 wherein said RF bias generator has a bias frequency between 10 kHz and 10 MHz.

Claim 22 (original): The apparatus of Claim 1 wherein said RF bias generator has a bias frequency between 50 kHz and 5 MHz.

Claim 23 (original): The apparatus of Claim 1 wherein said bias generator has a bias frequency between 100 kHz and 3 MHz.

Claim 24 (original): The apparatus of Claim 1 wherein said bias generator has a bias frequency of about 2 MHz to within about 5%.

Claim 25 (previously presented): A system for processing a workpiece comprising a plurality of plasma immersion ion implantation reactors, each of said plasma immersion ion implantation reactors comprising:

(1) an enclosure comprising a side wall and a ceiling and defining a chamber;

(2) a workpiece support pedestal within the chamber having a workpiece support surface facing said ceiling and defining a process region extending generally

across said wafer support pedestal;

(3) gas distribution for introducing a process gas containing a first species to be ion implanted into a layer of said workpiece;

(4) an RF plasma source power generator coupled across said ceiling or said sidewall and said wafer support pedestal for capacitively coupling RF source power into said process zone;

(5) an RF bias generator having an RF bias frequency and coupled to said workpiece support pedestal for applying an RF bias to said workpiece.

Claim 26 (original): The system of Claim 25 further comprising a wafer handling apparatus coupled to each of said plurality of plasma immersion ion implantation reactors.